A Level Computer Science

Exam Style Questions

Unit 1.4.2

Data Structures

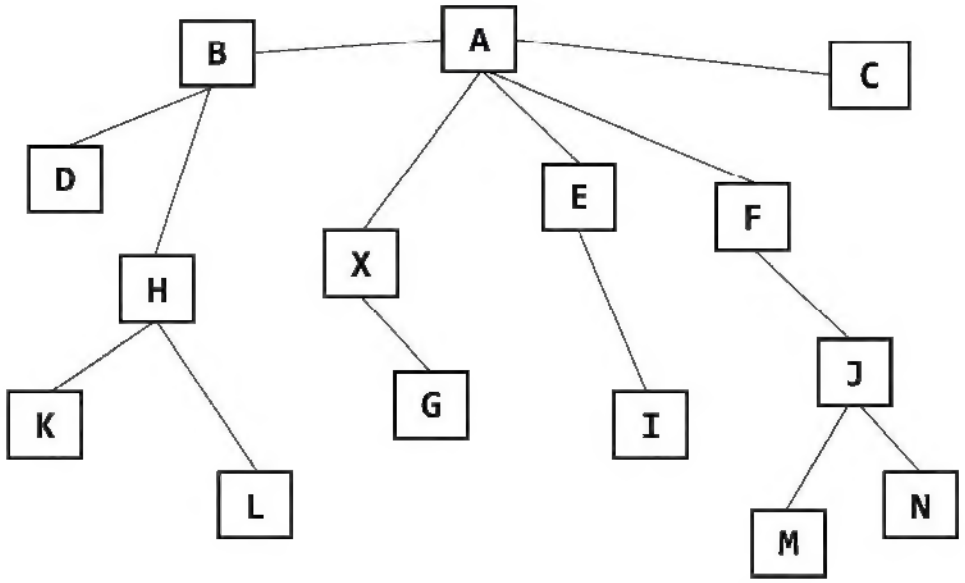
Graphs

Name		Date	

Score	Percentage	Grade
/ 20		

Question 1

A data structure is shown below in the diagram below.



a) Identify the data structure shown above

[1]

b) The programmer is considering using a depth-first (post-order) traversal, or a breadth-first traversal to find the path between node A and node X.

Explain the difference between a depth-first (post-order) and breadth-first traversal.

[4]

c) Show how a depth-first (post-order) traversal would find the path between node A and node X for the structure shown in the diagram above.

[6]

d) Explain how you used backtracking in your answer to part c).

[3]

Question 2

a) Describe what is meant by a graph structure.

[2]

b) The pseudocode below shows part of an algorithm which uses a queue to traverse a graph breadth-first. Complete the missing elements of the algorithm.

```
markAllVertices (notVisited)

start = 

markAsVisited(  )

pushIntoQueue(start)

while QueueIsEmpty() == 

    currentNode = removeFromQueue()

    while allNodesVisited == false

        markAsVisited(  )

     // following sub-routine pushes all nodes connected to
     // currentNode AND that are unvisited

     pushUnvisitedAdjacents()

    endwhile

endwhile
```

[4]